

## FATE OF PRIMARY MOLAR WITHOUT PERMANENT SUCCESSOR

### A TWIN CASE REPORTS

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#### ABSTRACT

*Longevity of primary molar without a permanent successor in the arch after its scheduled time of exfoliation is always a great challenge. Treatment strategies are always aimed to preserve the primary teeth in the arch to prevent space loss and to establish arch integrity. However, as per the hypothesis, it is stated that primary tooth is always subjected to physiological root resorption irrespective of the presence or absence of permanent successor. Two cases with vital primary molar without a permanent successor is discussed in this paper, wherein the first case white mineral trioxide aggregate (WMTA) was used in the pulp capping of a carious vital primary molar and in the second case no procedure was performed as the patient's parent was not willing for any treatment. In both the cases OPG was taken pre-operative and after a long-term follow up and the hypothesis are checked.*

**KEYWORDS:** Agenesis, Physiological Resorption, Oral panoramic Radiograph (OPG) & White Mineral Trioxide Aggregate

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#### INTRODUCTION

Tooth agenesis is the most common developmental disorder of human dentition, affecting 25% of the population. Orders of Agenesis include third molars, followed by Mandibular second premolars that accounts for 2.5% to 5%.<sup>1</sup> However treatment of retained primary molars with no premolar successors presents a greater challenge for a dentist and a thorough knowledge on the mechanism of physiological resorption is the need for the hour.

Root resorption is similar to that of bone remodeling characterized by odontoclasts, osteoclast, and cementoclast but they differ in their gene expressions. Tartrate-resistant acid phosphatase (TRAP) is an enzyme expressed in high amounts by physiological root resorbing osteoclasts and inflammatory macrophages, it is probably the most reliable marker of clastic cell differentiation. Osteoprotegerin (OPG), receptor activator of the nuclear factor kappa B (RANK) and its ligand (RANKL) are the key proteins that regulate metabolism and osteoclastic biology.<sup>2,3</sup>

Management strategies of such cases include preservation of the deciduous molar as long as possible followed by orthodontically closure of the space that is caused by the absence of the premolar and its predecessor by guiding the development of the dentition and/or use of appliances and replacement of the missing tooth with a

prosthesis. In some cases, when the decision is made to retain the pulpally involved primary tooth, pulp capping, pulpotomy or pulpectomy may be indicated.<sup>4,5</sup>

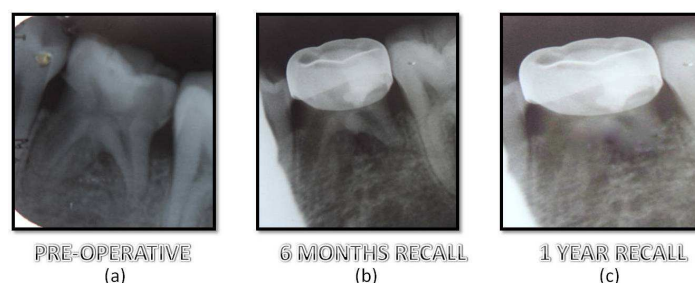
Whereas in the case of a carious primary molar with no permanent successor teeth, direct pulp capping can be carried out when a healthy pulp has been inadvertently exposed during an operative procedure. The tooth must be asymptomatic and the exposure site must be the size of a pinpoint in diameter and free of oral contaminants.

MTA is an aggregate of fine hydrophilic particles that hardens on contact with water.<sup>6</sup> It is comprised of 75% Portland cement, 20% bismuth oxide and 5% gypsum by weight, and while the initial compound was grey in color, a white mineral trioxide aggregate (WMTA) has recently become available as well.<sup>7,8</sup> This color change has broadened the indications for MTA, enabling its application in anterior teeth. Originally developed for use in endodontics for the repair of root perforations,<sup>9</sup> MTA was subsequently recommended for use as a root-end filling material. It has also been used in vital pulp therapy<sup>10,11</sup> and as an apical barrier in the treatment of immature teeth with non-vital pulp and open apices.<sup>12</sup> Potential uses of MTA in other dental and medical procedures are continually being explored. Although the American Academy of Pediatric Dentistry does not recommend direct pulp capping for caries exposed primary teeth promising results (over 90% success) of recent clinical trials may challenge that policy in the near future. Mineral trioxide aggregate (MTA), bonding agents, and enamel derivate protein (Emdogain) with or without prior rinsing of the exposed pulp with saline or an antibacterial solution (such as sodium hypochlorite or chlorhexidine) were compared to calcium hydroxide as capping agents and favorable results were obtained.<sup>13</sup>

This paper is aimed to rule out the hypothesis whether physiological resorption takes place in the primary molar without the permanent successor.

### CASE-1

A healthy 9-year-old girl was referred to the Department of Pedodontics with the complaint of a carious tooth in the mandibular left molar region. Clinical examination showed the mandibular left second primary molar (75) to be asymptomatic to percussion and no evidence of ankylosis or infra-occlusion. Radiographic examination revealed gross caries in the mandibular left second primary molar and absence of the successional premolar (Fig1-a). It was noted that agenesis of the mandibular left second premolar was unilateral. Based upon clinical and radiographic examination, diagnosis for 75 was dentinal caries approximating the pulp.



**Figure 1: (a)Diffuse Radiolucency Involving Enamel, Dentin and Approxiating Pulp  
(B)Internal Resorption of the Mesial Root Canal  
(C)Evident Internal Resorption of Both Mesial and Distal Root Canal**

An initial treatment plan was developed that was aimed to avoid any future malocclusion by the maintenance of the 75 for as long as possible, after which time a prostheticrehabilitation would be done. Accordingly, the decision was

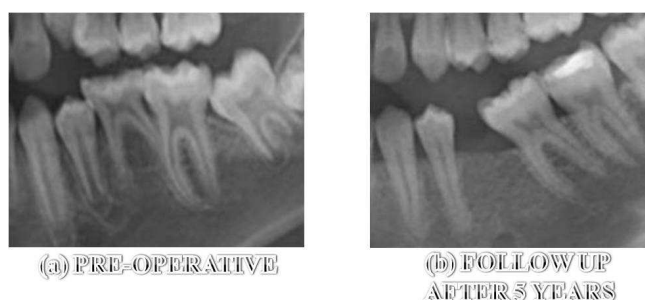
made to treat the 75 by direct pulp capping using WMTA (ProRoot, Dentsply). The treatment objectives and alternatives were explained to the patient and his parents, who provided their written consent prior to treatment.

A No. 245 bur (Mani&Co) in a high-speed handpiece was used for caries removal followed by the usage of spoon-shaped excavator. WMTA mixture was prepared according to the manufacturer's instructions and placed in the cavity. The cavity was then restored again with glass ionomer cement((Fuji IX, GC Corporation, Japan) and a stainless steel crown (3M Dental Products, USA). Regular follow-up appointments were conducted at 3,6,9 and 12 months.(Fig1-b). At 12-months of follow-up, the patient had no clinical signs or symptoms, but radiographic examination showed root resorption in the mesial root surface (Fig1 -c)

## CASE-2

A 12- year- old healthy girl was referred to the Department of Pedodontics with a complaint of crowding of lower anterior teeth. Clinically, there were malocclusion present with retained non-carious lower left second primary molar teeth, OPG was taken to assess the stage of the eruption, on radiographic interpretation a congenitally missing left lower second premolar was appreciated (Fig2-a).

However, when treatment modalities were discussed the patient's parent was not willing for any treatment, only oral prophylaxis was performed and the patient was recalled for review after 6 months. The patient revisited the Department only after 5 years with a complaint of food lodgement in the lower left molar region. On clinical examination there was exfoliation of the retained lower left second primary molar and inclined permanent molar in the space previously maintained by primary molar was seen. OPG was advised which revealed space closure due to the mesial shift of permanent first molar on the involved side (Fig2-b). The patient was advised for orthodontic treatment and undergone the same.



**Figure 2**

## DISCUSSIONS

Treatment options for congenitally missing mandibular second premolars vary according to the patient's age, the development stage of adjacent teeth and the root resorption and infra-occlusion of the primary predecessor.<sup>1</sup> Options include maintaining the primary tooth, extracting the primary tooth and allowing the space to close spontaneously, implant replacement, auto-transplantation, prosthetic replacement and orthodontic space closure.<sup>1</sup>

In growing patients, implants are contraindicated, as they impede the normal alveolar growth process.<sup>14</sup> Age is also an issue with regard to conventional fixed partial dentures, since preparation of the abutment teeth may need to be delayed due to pulp size in young patients, and long -term space maintenance may be necessary.<sup>1</sup> Auto-transplantation of a third molar or another premolar is a viable option, if a suitable donor tooth is available,<sup>1</sup> although the need for surgical

intervention is a disadvantage.<sup>15</sup> Extraction and spontaneous space closure is a conservative treatment option, but the timing of the extraction is critical, as early removal of the second primary molar can cause a series of changes in the dental arches, including a reduction in arch length, the inclination of adjacent teeth, alveolar bone resorption and extrusion of the antagonist's tooth. In such cases, future malocclusion may be avoided by maintaining the primary molar.<sup>16, 17</sup>

In the present cases, it has been proved irrespective of whether treatment is done or not, permanent successor teeth are present or not, primary teeth are always subjected to physiological root resorption, has it possess certain genetic factors involved. Even after the best material like white MTA was used and when no treatment was performed, physiological root resorption was evident. So our main goal in managing such cases should be aimed to increase the longevity of the primary teeth with no successor until all teeth erupt in the arch and till the occlusion gets stabilized.

## CONCLUSIONS

As there is only a few knowledge in the literature aiding in the management of primary teeth with no successor, unique management strategies are yet to be employed and the concept of primary root resorption is not fully understood as in some cases retained primary tooth is also found in adulthood. The hypothesis is proved that there is always a deep-rooted genetic role in Dentistry but however it is always subjected to further research and development.

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